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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,702	11/19/2003	Igor Shen Djokovic	AKTINO.0004P	8872
32856	7590	12/27/2007	EXAMINER	
WEIDE & MILLER, LTD. 7251 W. LAKE MEAD BLVD. SUITE 530 LAS VEGAS, NV 89128			TRAN, KHANH C	
			ART UNIT	PAPER NUMBER
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			12/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/717,702

Applicant(s)

DJOKOVIC ET AL.

Examiner

Khanh Tran

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11-15, 17-29 and 31-55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-9, 11-13, 22-29, 31-35 and 43-55 is/are allowed.
- 6) ☒ Claim(s) 14, 15, 17, 18, 20, 21, 36-39, 41 and 42 is/are rejected.
- 7) ☒ Claim(s) 19 and 40 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. The Amendment filed on 10/02/2007 has been entered. Claims 1-7, 8-9, 11-15, 17-29 and 31-55 are pending in this Office action.

### ***Response to Arguments***

2. Applicant's arguments, see Applicants' Remarks, filed on 10/02/2007, with respect to the rejection(s) of claim(s) 8-9, 11-15, 18, 2-21, 29, 31 and 33-35 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kadous U.S. Patent Application Publication No. US 2003/0189999 A1 (previously cited).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 14-15, 17-18, 20-21, 36-39 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadous U.S. Patent Application Publication No. US 2003/0189999 A1 (previously cited).

Regarding claim 14, referring to FIG. 6, in paragraph [0141], Kadous teaches RX MIMO/data processor 160a includes a number of successive (i.e., cascaded) receiver processing stages 610a through 610t, one stage for each of the symbol streams to be recovered.

In paragraph [0142], Kadous teaches that for the first stage 610a, spatial processor 620a receives and process  $N_R$  received symbol streams from RX OFDM processor 158. One of the detected symbol streams is then selected to provide to RX data processor 630a. Processor 630a further processes (e.g., demodulates, deinterleaves, and decodes) this symbol stream to provide a corresponding decoded data stream, which is an estimate of the transmitted data stream corresponding to the symbol stream being recovered. In paragraph [0143], Kadous teaches that for the first stage 610a, interference canceller 640a receives the decoded data stream from RX data processor 630a and performs the processing (e.g., encoding, interleaving, and symbol mapping) to derive a remodulated symbol stream, which is an estimate of the symbol stream just recovered. The remodulated symbol stream is further processed in the time or frequency domain to derive estimates of the interference components. In light of the foregoing disclosure, the estimates of the interference components correspond to the claimed cancellation signal; because the interference canceller generate the estimates of the interference components, the interference canceller performs an equivalent function of the claimed noise cancellation system. Furthermore, because the interference canceller combines the estimates of the interference components with the received symbol streams  $y^1$ , therefore, the interference canceller

also performs an equivalent function of the claimed junction; and RX data processor (see FIG. 6) correspondents to the claimed decoder.

Kadous, however, does not disclose the step storing at least one of the two or more signals in a memory and retrieving from memory as set forth in the application. Because interference canceller 640a subtracts interference components from the first stage's input symbol streams  $y^1$  to derive  $N_R$  modified symbol streams, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Kadous teachings to store symbol streams into memory and retrieve from memory symbol streams for later processing by the interference canceller 640a.

Kadous does not disclose a delay as set forth in the application claim.

Referring back to FIG. 6, because the interference canceller delays to synchronize the received symbol streams  $y^1$  with decoded data stream on each stage, one of ordinary skill in the art would have recognized that the interference canceller acts as the claimed delay.

Regarding claim 15, as recited in claim 14 rejection, RX data processors 630a ... 630t (see FIG. 6) correspondent to the claimed decoders.

Regarding claim 17, as recited in claim 14 rejection, interference canceller 640a receives the decoded data stream from RX data processor 630a and performs the processing (e.g., encoding, interleaving, and symbol mapping) to derive a remodulated symbol stream, which is an estimate of the symbol stream just recovered. The

remodulated symbol stream is further processed in the time or frequency domain to derive estimates of the interference components. Because the remodulated symbol stream is further processed in the time or frequency domain to derive estimates of the interference components, one of ordinary skill in the art at the time the invention was made would have recognized that the interference canceller further perform an equivalent function of a filter as claimed in the application claim.

Regarding claim 18, in paragraph [00126], Kadous coding scheme may include any combination of cyclic redundancy check (CRC) coding, convolutional coding, Turbo coding, **block coding**, and so on. And in paragraph [0104], Kadous shows the performance of various SIC processing schemes, e.g. performance is provided for a (2,4) MIMO system with two transmit antennas and four receive antennas, and which uses 16-QAM with rate [fraction (1/2)] Turbo coding.

Regarding claim 20, referring to FIG. 6, RX data processor 630 is configured to provide decoded signal to interference canceller 640.

Regarding claim 21, as recited in claim 13 rejection, Kadous techniques are provided to process a number of received symbol streams in a MIMO system with multipath channels such that improved performance may be achieved when using successive interference cancellation (SIC) receiver processing; see also FIG. 6.

According to SIC processing, stages 610a ... 610t receive interference components from previous decoded channels.

Regarding claim 36, claim is rejected on the same ground as for claim 14 because of similar scope.

Regarding claim 37, claim is rejected on the same ground as for claim 15 because of similar scope.

Regarding claim 38, as recited in claim 14 rejection, referring back to FIG. 6, because the interference canceller delays to synchronize the received symbol streams  $y^1$  with decoded data stream on each stage, one of ordinary skill in the art would have recognized that the interference canceller acts as the claimed delay.

Regarding claim 39, claim is rejected on the same ground as for claim 18 because of similar scope.

Regarding claim 41, claim is rejected on the same ground as for claim 20 because of similar scope.

Regarding claim 42, claim is rejected on the same ground as for claim 21 because of similar scope.

***Allowable Subject Matter***

4. Claims 1-7, 8-9, 11-13, 22-29, 31-35, 43-49 and 50-55 are allowed.

5. Claims 19 and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Van Heeswyk et al. U.S. Patent 6,298,050 B1.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KCT



KHANH C. TRAN  
PRIMARY EXAMINER

12/26/2007  
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